The effect of oral caffeine intake on the perceived wakefulness in individuals with and without ADHD

Scientific Writing Exercise

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Summary

The paradoxon that caffeine has no effect or even decreases wakefulness is commonly described by Attention Deficit Hyperactivity Disorder (ADHD) patients as well as some healthy individuals. Paradoxical effects of caffeine in disorders of the dopaminergic / noradrenergic systems, like ADHD, may hint at non-stimulatory interactions of caffeine in these systems or adjacent neuronal pathways. We found a statistically significant difference in the effect of caffeine intake on the perceived wakefulness of ADHD patients and healthy individuals using a double-blind placebo-controlled trial, showing no mean increase in perceived wakefulness for ADHD patients. These findings lay the ground work for molecular investigations into the interactions of caffeine and the dopaminergic / noradrenergic systems, especially in disorders involving these neuronal pathways, and may even contribute to further our understanding of the biochemical basis of these disorders on a neurological level.

Introduction

Methods

Results

To investigate a possible correlation between the neurobiochemistry of ADHD and the effect of caffeine on perceived wakefulness, we recruited twelve

healthy individuals and twelve individuals diagnosed with ADHD. Both groups were equally split into a group that was administered 30 mg of caffeine in the form of coffee and a group that was given the same amount of decaffeinated coffee, minimizing the possible effects of other compounds on our measured parameter.

Our measurements revealed a significant correlation between caffeine intake and perceived wakefulness in healthy individuals (average increase of 30%, $p = 0.005$) while not showing any significant differences for the group of ADHD patients (no increase / decrease, $p = 0.81$) as shown in Figure 1. This has also been corroborated by previous studies. (Leon, 2000)

In summary, we found that neurotypical individuals display a significant stimulatory response to oral caffeine consumption while individuals with ADHD did not show signs of increased wakefulness after intake of 30 mg of caffeine.

Discussion

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Declaration of Interests

The authors declare no competing interests.

Author Contributions

Conceptualization, T.N.; Methodology, T.N.; Formal Analysis, T.N.; Investigation, T.N.; Writing – Original Draft, T.N.; Writing – Review & Editing, T.N.; Project Administration, T.N.; Funding Acquisition, T.N.

Figures

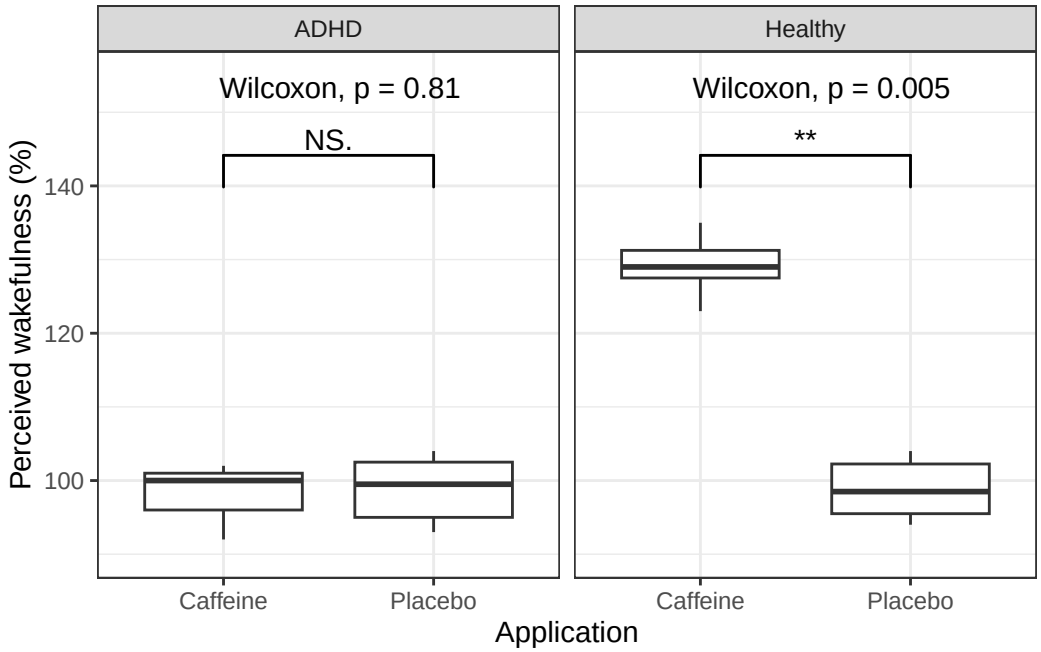

Figure 1: Effect of oral caffeine intake on the perceived wakefulness of healthy individuals and ADHD patients. Caffeine group was administered 30 mg of caffeine in form of coffee. Placebo group was administered decaffeinated coffee. 100% perceived wakefulness corresponds to normal wake alertness. Twelve individuals in each health status group. Six individuals per application. NS. = Not significant (P > 0.05); ** = Significant (P <= 0.01)

References

Leon, M.R., 2000. Effects of caffeine on cognitive, psychomotor, and affective performance of children with Attention-Deficit/Hyperactivity Disorder. Journal of Attention Disorders 4, 27–47. https://doi.org/10.1177/108705470000400103